MedicalXpress

Researchers reveal how mindfulness training affects health

February 12 2015

Over the past decade, there have been many encouraging findings suggesting that mindfulness training can improve a broad range of mental and physical health problems. Yet, exactly how mindfulness positively impacts health is not clear.

Carnegie Mellon University's J. David Creswell—whose cutting-edge work has shown how mindfulness meditation reduces loneliness in older adults and alleviates stress—and his graduate student Emily K. Lindsay have developed a model suggesting that mindfulness influences health via stress reduction pathways. Their work, published in *Current Directions in Psychological Science*, describes the biological pathways linking mindfulness training with reduced stress and stress-related disease outcomes.

"If mindfulness training is improving people's health, how does it get under the skin to affect all kinds of outcomes?" asked Creswell, associate professor of psychology in CMU's Dietrich College of Humanities and Social Sciences. "We offer one of the first evidence-based biological accounts of mindfulness training, stress reduction and health."

Creswell and Lindsay highlight a body of work that depicts the biological mechanisms of mindfulness training's stress reduction effects. When an individual experiences stress, activity in the prefrontal cortex—responsible for conscious thinking and planning—decreases, while activity in the amygdala, hypothalamus and anterior cingulate

cortex—regions that quickly activate the body's stress response—increases. Studies have suggested that mindfulness reverses these patterns during stress; it increases prefrontal activity, which can regulate and turn down the biological stress response.

Excessive activation of the biological stress response increases the risk of diseases impacted by stress (like depression, HIV and heart disease). By reducing individuals' experiences of stress, mindfulness may help regulate the physical stress response and ultimately reduce the risk and severity of stress-related diseases.

Creswell believes by understanding how mindfulness training affects different diseases and disorders, researchers will be able to develop better interventions, know when certain treatments will work most effectively and identify people likely to benefit from mindfulness training.

As the birthplace of artificial intelligence and cognitive psychology, Carnegie Mellon has been a leader in the study of brain and behavior for more than 50 years. The university has created some of the first cognitive tutors, helped to develop the Jeopardy-winning Watson, founded a groundbreaking doctoral program in neural computation, and completed cutting-edge work in understanding the genetics of autism. Building on its strengths in biology, computer science, psychology, statistics and engineering, CMU recently launched BrainHub, a global initiative that focuses on how the structure and activity of the brain give rise to complex behaviors.

Provided by Carnegie Mellon University